

USPTO Customer No. 25280
Serial No: 10/764,234

Inventor(s): Batlaw et al
Case No: 5729

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application of: R. Batlaw et al

Serial Number: 10/764,234

Filed: January 23, 2004

Title: PROCESS FOR MAKING TWO STAGE INJECTION STRETCH
BLOW MOLDED POLYPROPYLENE ARTICLES

Group Art Unit: 1732

Examiner: S. Staicovici, PhD

Commissioner for Patents
PO Box 1450
Alexandria, VA 22313-1450

Certificate of Facsimile Transmission
I hereby certify that this correspondence, and all correspondence referenced herein as being enclosed with this correspondence, is being sent by facsimile to 571-273-8300 (Central Fax Number).

Date: December 12, 2005
Signature: Linda-Ann Manley
Name: Linda-Ann Manley

DECLARATION OF INVENTOR BERNARD VERMEERSCH

This Declaration is submitted with an Amendment in response to the Office

Action mailed September 28, 2005.

1. I, Bernard Vermeersch, a co-inventor of the above described patent application, provide the Declaration set forth below.

2. I am currently employed as a Development Engineer for Milliken & Company, which is headquartered in Spartanburg, South Carolina. I received a Bachelor degree in Chemical & Biochemical Engineering from the Institute of Technology Group T in Leuven (Belgium) in 1990. I am a citizen of the country of Belgium. I speak and read the English language.

USPTO Customer No. 25280
Serial No: 10/764,234

Inventor(s): Batlaw et al
Case No: 5729

3. I personally performed technical work leading up to the discoveries claimed in this patent application. I am a co-inventor of the patent application referenced above. Recently, I reviewed patents that are cited as prior art against this application, including the following:

United States Patent No. 3,944,643 (Sato)
United States Patent No. 3,966,382 (Edwards)
United States Publication No. 2004/0063830 A1 (Schmidt)
Japanese Patent No. JP360125627A

4. Two stage container manufacture is comprised of: (1) injection molding of a preform, followed by cooling of the preform to ambient temperature, followed by (2) stretch blow molding the preform to form a container.

5. There has been a long felt need in the container manufacturing industry for a process of making polypropylene (PP) containers in a manner that produces containers of high quality, good clarity, and low haze at a rate that makes the process economically viable. The invention of this application addresses that industry need.

6. The shape and thickness of preforms determines (1) their suitability for container manufacture, and (2) the speed at which containers may be stretch molded from such preforms. It has been common in conventional polypropylene (PP) processes to employ PP preforms having fairly thick walls. However, thick preform walls reduce the processing speeds that can be achieved. Thick-walled preforms must be cooled longer before removal from a preform mold, thus undesirably increasing processing time in preform manufacture.

USPTO Customer No. 25280
Serial No: 10/764,234

Inventor(s): Batlaw et al
Case No: 5729

7. A disadvantage of prior PP container manufacturing processes has been the inability to make containers of high clarity (i.e. low haze) at a high rate of speed. For example, it has been known to make relatively clear polypropylene containers having a percentage haze value of about 1-1.5 percent haze. However, conventional methods for making polypropylene containers having such low levels of haze have been very slow. Slow processes are not economically viable in the marketplace. It is a significant and difficult challenge to develop processes that will facilitate increased stretch molding speed while not sacrificing clarity of the resulting container.

8. There has been a long felt need in the industry of container manufacturing to provide polypropylene materials, preforms, and container articles in a process that will afford a cost-effective manufacture of low-haze, high clarity products. A process of employing polypropylene in a manner that will result in highly efficient preform and container production at a minimum cost with a fast cycle time is very desirable.

9. I have reviewed the amended claims of the invention of this patent application. The claims require three specific processing ranges or "windows" to be provided in the practice of the invention. The discovery of these three processing windows, and their synergistic combination in the overall process, is unexpected to a person of skill in the art. The employment of these features in the practice of the invention presents surprisingly good results that would not have been anticipated (or obvious) to a person of skill in the art, even if such a person had knowledge of the content of the above cited prior art references.

USPTO Customer No. 25280
Serial No: 10/764,234

Inventor(s): Badaw et al
Case No: 5729

10. In the invention, these processing "windows" for variables of perform sidewall thickness, polymer MFI, and injection rate were discovered only after significant and extensive engineering research and development work. When processing windows for each of these three variables are employed, it leads to exceptional and desirable bottles having low levels of haze, and at high production rates. The prior art, to my knowledge, does not disclose such a process, as claimed in the above referenced application for patent. If the prior art could address the current industry needs, and if it did disclose the processing windows of this invention, there would be no need to engage in the current research and development efforts being expended in the industry. The prior art does not disclose or render obvious the invention of this application.

11. The invention (in one embodiment) is directed to formation of a preform article in a first stage preform manufacture, using polypropylene (PP) having a specific melt flow index ("MFI") of about 6-50 grams/10 minutes composition, for injection into a mold. Further, the injection occurs at a rate of greater than about 5 grams of chemical composition per second. The preform article, in the practice of the invention, must be provided in a specific and predefined thickness. The sidewall thickness of the preform in one aspect of the practice of the invention is from about 2 mm to about 4 mm.

12. None of the prior art references cited above in paragraph 3 above disclose the features of the invention. Further, the combination of these references does not disclose or render obvious the invention.

13. U.S. Patent No. 3,944,643 to Sato et al. ("Sato") is directed to a one stage injection stretch blow molding process that uses a reheating step to enable the

USPTO Customer No. 25280
Serial No: 10/764,234

Inventor(s): Batlaw et al
Case No: 5729

production of high quality oriented containers (also known as 4-station one stage ISBM

machines supplied by e.g. Nissei ASB in Japan). Sato does not specify any particular mold fill rate, and there is no evidence that Sato contemplated a mold fill rate of greater than 5 grams per second. The reference to a melt flow index of 7 g/10 min suggests that a significantly reduced filling rate was required in the practice of Sato to achieve high bottle clarity. Furthermore, Sato does not specify any particular side wall thickness for the preform. Sato suggests a thickness for the final container of 0.1 mm (example 1) and 0.1 or 0.2 mm (example 2) for ethylene propylene copolymers (example 2, column 6, lines 45-50). No suggestion is made in Sato as to the preform side wall thickness that may be needed to achieve a final container of such dimension.

14. United States Patent No. 3,966,382 to Edwards et al. ("Edwards") is directed to a process and apparatus for molding of thin walled plastic articles, in which an "extremely accurately controlled wall thickness" is employed. See Edwards patent, column 1, line 60 to column 2, line 5. The Edwards reference discloses polystyrene or high density polyethylene or polypropylene preforms, as examples. Average wall thickness of such preforms is reported at 0.020 inches (0.5 mm), with very little variation in thickness. Column 2, line 3. Edwards represents a disclosure of a very thin-walled preform. Edwards does not teach: (a) a polypropylene having an MFI of between about 6 and about 50 grams/10 seconds; or (b) a process having a mold fill rate of greater than 5 grams of composition per second; or (c) a preform with a thickness between about 2 mm and about 4 mm. Edwards specifically teaches away from the claimed invention, because Edwards teaches a preform having an extremely thin wall of thickness 0.5 mm. The claims of the invention require a preform which is at least

USPTO Customer No. 25280

Serial No. 10/764,234

about 4 times (i.e. 400%) greater than the recommended wall thickness of preforms

Inventor(s): Batlaw et al

Case No: 5729

suggested by Edwards.

15. United States Publication No. 2004/0063830 A1 ("Schmidt") teaches polypropylene resin compositions which employ a nucleating agent. Thus, Schmidt is cited for disclosure of a nucleating agent in a polymeric article. Schmidt does not disclose compositions or articles for injection stretch blow molding by way of manufacture of preforms. Schmidt does not disclose any of the elements of the invention relating to the specific claimed range for MFI, preform wall thickness, or injection rate.

16. The Japanese reference (JP 360125627 A) appears to disclose stretch blow molding of a random copolymer of propylene. The reference teaches a container made by stretch blow molding. A review of the Abstract of the Japanese reference reveals no evidence that it remedies or teaches the specific claimed ranges for MFI, injection rate, and preform thickness specified in the claims of this application. Apparently, this reference is cited for its disclosure of the use of a nucleating agent.

17. Neither Sato nor Edwards specify an injection rate of greater than 5 g/sec, as specified in the invention of this application. Thus, one feature of the invention is completely absent from the teachings of these two references. All of the elements of the invention have not been found in the cited references.

18. Edwards discloses an extremely thin preform article that is well below the amended sidewall thickness in the above noted claims. Neither Sato nor Edwards disclose a preform having a thickness in the claimed range of the invention, i.e. about 2

USPTO Customer No. 25280
Serial No: 10/764,234

Inventor(s): Batlaw et al
Case No: 5729

mm to about 4 mm. Preform thickness is a second feature of the invention that is not disclosed or taught by either Sato or Edwards.

19. Edwards teaches away from the invention. Edwards teaches using preforms with thickness of 0.5 mm in thickness, in which the thickness is carefully controlled to within 5% variance (i.e. only 5% variance from 0.5 mm; see column 2, lines 1-10). Edwards specifically suggests only very thin preform articles which are exactly 0.5 mm (or nearly exactly 0.5 mm, varying only 5% in thickness. The combination of Edwards with JP 360125627A is not suggested by any prior art reference that I have reviewed.

20. The Office Action characterizes the claimed invention as routine experimentation, or routine optimization. The invention of this application is not routine experimentation, and is not merely optimization of a so-called "result effective variable". The invention resulted from extensive research and development efforts and study, over a relatively long period of time, by many scientists and engineers. The two-stage ISBM process requires two separate pieces of equipment, one to make the preforms and one to blow the bottles. As a result, the bottle quality and blowing behavior can only be evaluated at a later moment, which significantly increases the complexity of this development. In addition to this, the current available inspection tools for preform quality can not reveal potential issues with container clarity. There is a significant difference between how fast a preform can be physically filled and the filling rate that corresponds with high container clarity when the container later is stretch blow molded. The invention represents a process for surprisingly efficient manufacturing processes

USPTO Customer No. 25280

Serial No: 10/764,234

for PP preforms and high clarity containers, and would not be expected by a person of

skill in the art.

Inventor(s): Batlaw et al

Case No: 5729

21. There is no stated evidence of express teachings in the cited prior art to show that a person of skill in the art, with knowledge of the cited art, would somehow recognize that all three variables, i.e. melt flow index, mold filling rate, and side wall thickness, in the specific ranges disclosed in the application of the invention, are interrelated to each other in such a way as to achieve, together the recognized surprising result of the invention. These parameters, viewed in the context of the invention as a whole, are not in my opinion "result effective variables" because one could not have predicted either the processing windows, or the results of using such windows, at the time the invention was made.

22. I further declare that all statement made herein, of my own knowledge, are true and that all statements made on information are believed to be true. Furthermore, these statements were made with the knowledge that willful false statements and alike so made are punishable by fine or imprisonment, or both, under Section 1001 Title 18 of the United State Code, and that such willful false statements may jeopardize the validity of the above referenced patent application or any patent that may issue thereon.



Bernard Vermeersch

Date 12/12/2005